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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/641,123	08/16/2000	Leon Awerbuch	4424791-0002	3791

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PATENT DEPARTMENT
1155 AVENUE OF THE AMERICAS
NEW YORK, NY 10036

EXAMINER

FORTUNA, ANA M

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 09/05/2002

15

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-15

Office Action Summary

Application No.

09/641,123

Applicant(s)

Awerbuch

Examiner

Ana Fortuna

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jul 3, 2002
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 24-29 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 24-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. A new ground of rejection is discussed bellow.

Claim Rejections - 35 U.S.C. § 112

2. Claim 24, and 26 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the ion selective membrane use to produce the reduced hardness ions concentration stream is not recited in the claims above. In page 2-3 of applicant's specification the treatment of water by an ion selective membrane or nanofiltration membrane before the desalination is disclosed as critical to the invention.

3. Claims 24 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 24 and 26 are unclear as to what is intended, since claim 24 is directed to blending a "first **softened** stream", and claim 26 refers to the **first stream** as a water produced in a desalination system and selected from reject, blowdown and recycled streams. Claim 26 is unclear as to whether it should refer to the **second stream** instead, as the concentrated stream.

Claim Rejections - 35 U.S.C. § 102

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3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 24 is rejected under 35 U.S.C. 102(b) as being anticipated by Gelblum (3,725,267)(hereinafter '267). Reference '267 discloses treating water containing a high concentration of hardness ions by a desalination unit, and further treating a portion of the feed water in a pretreatment process of softening process and mixing or blending the softened water with the raw water (high concentrated in ions) with the softened water prior to the desalination unit, the process reduce scale formation in the desalination (distillation unit), e.g. multi-stage flash system. The process is disclosed in the above reference as capable of reducing the size of the plant and its operation costs (entire disclosure, in particular column 3, lines 53-57, column 4, lines 22-34, and column 5, lines 14-16). The reduction in top operating temperature of the system and recovery of water by the desalination system is inherent of the process disclosed in '267, since mainly a portion of scale agents are remove by the softening step, and the softened stream is further blended with raw stream and later treated by a multi-stage first distillation as in the present invention.

Claim Rejections - 35 U.S.C. § 103

5. Claims 1, 2, 3, 4, 5, 6, 7, 8, 11-16, 24, 25, 26, 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gelblum (3,725,267)(hereinafter '267), in view of Wensley et al

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("Ion selective membranes a presoftening process for seawater distillation"). Reference '267 discloses pretreating a portion of the feed water, and fails to disclose pretreating the sea water or a portion of the water with a membrane softening including ion selective membrane. Wensley et al disclose treating water with an ion selective membrane for softening the water, and further treating the water in a desalination process, e.g. MSFD. Wensley et al also teaches that removing 60 percent of calcium and sulfate ions, without significantly removing sodium chloride will be sufficient to improve the desalination system operation to a level of 60 to 70 % (page 420, second paragraph). The reduction in temperature operation and other advantages of the process are also discussed in the article, page 425, second paragraph, entire article). It would have been obvious to one skilled in the art at the time the invention was made to treat only a portion of the feed concentrate water in the softening process, since only 60 % reduction of the scale forming agents, e.g. sulfates and calcium will need to be remove to improve the process according to Wensley et al. Therefore, since membranes are available with capacity to remove from 60 to 85 % of scale forming ions, and only 60 % will be enough to operate the desalination or distillation unit at economic operating conditions, it would have been obvious to one skilled in the art at the time the invention was made to remove that 60 % by treating a portion of the raw water, or adjusting the water to the concentration level suggested by Wensley et al before treating the water in a desalination unit, e.g. by mixing with a softened stream.

It would have been further obvious to modify the process of '267 by using a membrane as pretreatment for removing the calcium and magnesium ions, as suggested by Wensley et al. '267

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also teaches that removing from 60 to 70 % of scale ions to reduce the size and operation costs of the plant. The temperature effect reduction are part of the costs of the operation of the plant , and are therefore inherently disclosed. As to claim 5, using compression distillation in substitution of MSFD is common knowledge in the art. As to claims 7 and 8 the operating temperature is disclosed in Wensley (Fig. 1), and the membrane as having the nanofiltration properties is also disclosed, e.g. the membrane of Cadotte et al a polyamide membrane composite having a thin layer with selectivity to divalent ions, while passing sodium chloride)(page 420, and 422 second paragraph). As to claim 11, the operating pressure is also disclosed in Wensley (page 422, second paragraph, e.g. 200 psi). As to claims 12-15, the changes of quality with pressure are inherent of the membrane, and depends on the concentration level of the feed, at higher concentrations lower pressure are conventionally recommended for higher quality in membrane operating processes. Using intermedia container for storing permeate or providing a direct mixing line it would have been common knowledge in the art at the time the invention was made. Claim 15 is redundant and claim 16 is cumulative, as claiming multiple units to produce multiple or cumulative results, e.g. higher quality, or management of higher volumes of feed water. As to claims 26, 28, and 29 treating concentrate water having the same composition, e.g. hardness ions, and in particular sodium, calcium and sulfates, by the membrane process discussed above, will produce similar results, in terms of scale agents retention, when using the membrane suggested by Wensley et al. As it would have been expected by the skilled artisan at the time the invention was made, based on membrane properties or retention.

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Claim Rejections - 35 U.S.C. § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 3, 5, 8, 13, 14-18, 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Al-Samadi (6,113,797) (hereinafter '797). Reference '797 teaches treating a stream of water containing a high concentration of hardness ions by a first nanofiltration or reverse osmosis membrane, treating the rejected stream from the first stage in a nanofiltration membrane or reverse osmosis, producing a permeate from the first stage, producing a permeate in the second stage and mixing a portion of the second permeate with the feed stream treated with the first membrane (Figures 3-4, elements 6, 8, 7, 11, 25). The process further includes pretreatment, and further secondary treatment of both permeates and retentates from the process, and the production of potable water (abstract). When selecting the first membrane as reverse osmosis unit, and the second membrane as nanofiltration unit, the treatment of a concentrated stream from a reject, e.g. reject from the concentrated of the first stage, is softened in an ion selective membrane or nanofiltration membrane, as clearly showed in the figures a blending of a portion of the softened stream and the feed stream occurs at a point between conduits 3 and 25. The effect on top operating temperature is not disclosed by '797, however, '797 discloses that the

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combination of the permeate from the second stage and the feed to the first stage is done in order to improve product water purity, reduction of the cost of the overall process is also disclosed (column 3, lines 40-67, and column 4, lines 1-39, column 11, lines 25-51). The operating pressures are also disclosed (column 7, lines 21-33). As to claims 3, 5, the desalination system as reverse osmosis membrane is disclosed (element 1). As to claims 8, and 26, the membrane for softening is disclosed as a nanofiltration membrane as one of the embodiments, e.g. element 11). As to claim 2, recycling or blending from 10 to 100 % of the second membrane permeate is suggested by '797 (column 11, lines 39-46). As to claims 12-15, variations in the permeate quality depending on degree of concentration or operating pressures, storing in a buffer or container prior to blending the permeate or softened stream it would have been expected or obvious to one skilled in the ordinary art at the time the invention was made. As to claim 16, using multiple membranes, or clusters for producing cumulative results is common knowledge in the art. As to claim 18, adding acid or adjusting pH as part of the pretreatment is disclosed in '797 (column 7, last paragraph, column 8, lines 1-15). As to claim 27, the increase in recovery by the blending of streams is disclosed in '797, and discussed above. The effect in operating temperatures or effect in operating temperatures is not clearly disclosed in particular for the case where the desalination unit is a reverse osmosis unit, however, improving the operating conditions, e.g. pressure, plant cost and water quality by the process are disclosed in '797, and cited in sections discussed above. Obtaining an optimum operating temperature seems to be inherent of the operating conditions of '797, since lower overall capital and operating costs are

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achieved by the process (column 8, lines 46-57). Operating temperatures of about 25 degree C are normally set for reverse osmosis or nanofiltration membranes. It would have been obvious to one skilled in the art at the time the invention was made to operate the process at a recommended manufacturing temperature in combination with the further steps suggested by '797 to achieve the economic advantages disclosed in '797.

8. Claims 1-18, 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan (WO 99/16714), further in view of Gelblum (3,725,267)('267). Hassan's reference is discussed in the record as teaching the pretreatment of sea water by nanofiltration, for softening and further treating the softened stream by a desalination unit, e.g. MSF, reverse osmosis, etc. alternatively (entire disclosure). Applicant's argues that Hassan does not disclose blending a portion of the softened stream with the feed water or sea water. Reference '267 teaches that by removing only a portion, e.g. 60% -70% of scale forming agents, e.g. calcium and sulfates, substantial economic results, e.g. reduction of plant size and operations costs are achieved (entire document, in particular (column 4, lines 21-34). It would have been obvious to one skilled in the art at the time the invention was made to modify the process of Hassan to optionally add a portion of the softened water, as make up water for the desalination treatment, based on the teaching that reduction in operating cost can be achieved by just removing a portion of the scale agents as disclosed in '267. Effects in temperature reduction are inherently involved in the plant operation costs, as recognized by Hassan.

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9. Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawshima et al (5,238,574)(hereinafter '574). Reference '574 discloses treating a concentrated stream of water and blending the stream with a softened stream of water from a reject (from the first treatment step), and treating the mixture in a desalination unit (Figure 2, abstract). The desalination unit is a reverse osmoisis uit, and the softening stream is produced by a loose reverse osmoisis membrane treatment of the rejected stream from the reverse osmosis desalination unit, mixing or blending the feed, e.g. salt water with the softened stream at a point before a feed pump is also disclosed (elements 10, 12, column 3, lines 30-53). '574 also discloses producing water of potable quality by the process at high flow rate, the temperature effect in the process using desalination unit is not disclosed, however, normal temperatures or low operating temperaturus are dislcosed, e.g between 25 to 30 degree C (column 10, lines 27-43, column 12, lines 56-68, through column 13). Therefore, the advantages of the process, quality of the product, flux and temperature conditions are disclosed in '797, it would have been obvious to one skilled in the art at the time the invention was made to expect the same improvment conditions in temperature and product quality when dealing with the same type of water source.

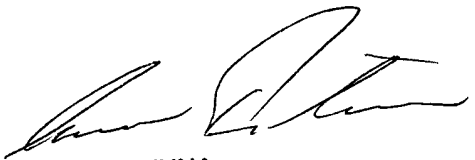
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana Fortuna whose telephone number is (703) 308-3857. The examiner can normally be reached on Monday-Friday from 9:30 to 6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker, can be reached on (703) 308-0457. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310 for regular responses, and (703)872-9311 for after finals.

Ana Fortuna

August 29, 2002



ANA FORTUNA
PRIMARY EXAMINER